APPENDIX X

HEAT CAPACITY AND CALORIFIC INTENSITY CURVES

BY A. D. WILLIAMS

HEAT is probably the energy of the moving molecules of a substance. Its intensity is measured by the thermometric scale, and its quantity by the Calorie or the British thermal unit. Heat transfer takes place by conduction, convection or radiation and will occur whenever a temperature differential exists. Fuel is merely latent heat energy. The quantity of heat stored in a unit of fuel may be determined by the calorimeter or computed from the chemical composition of the fuel. But the amount of heat stored up within the fuel does not supply any index of the temperature differential which may be established by its combustion. For instance, blue water gas at 300 B.t.u per cubic foot will produce a higher temperature than natural gas of three times this thermal value or producer gas of one-half its thermal value, while all of these fuels may be used in a suitably designed furnace for the melting of steel or for other high-temperature applications.

Combustion is the oxidation of fuel, releasing the latent heat and establishing a temperature differential which will permit utilization of the heat. The losses which occur in combustion are small and comparatively unimportant in comparison with the enormous losses which occur in the application and utilization of the heat released. At the same time fuel costs are continually advancing. This leads to a consideration of the possibility of substituting for one fuel another, or of introducing methods of operation and apparatus, which will accomplish

the result at a lower cost.

Comparison of the relative values of different fuels for any given purpose involves many factors, any one of which may have a determinative effect. There are many tables giving the thermal